

CLAIMS

1. A modulation apparatus comprising:
  - a first frequency-increasing SSB modulator that performs SSB modulation on a first input symbol to obtain 5 a USB signal;
  - a second frequency-increasing SSB modulator that performs SSB modulation on a second input symbol to obtain a LSB signal; and
  - a combiner that combines the USB signal and the LSB 10 signal,

wherein the second frequency-increasing SSB modulator performs SSB modulation using a carrier frequency higher than a carrier frequency used in the first frequency-increasing SSB modulator by the 15 fundamental frequency of the input symbol.
2. A demodulation apparatus comprising:
  - a first frequency-decreasing demodulator that demodulates an input modulation signal by a cosine curve with a predetermined carrier frequency to obtain a first 20 demodulation signal; and
  - a second frequency-decreasing demodulator that demodulates an input modulation signal by a sine curve with a carrier frequency higher than the carrier frequency used in the first frequency-decreasing demodulator by 25 the fundamental frequency of a symbol.
3. A demodulation apparatus comprising:
  - a detector that performs quadrature detection on

an input modulation signal by a predetermined carrier frequency to obtain a first detection signal and a second detection signal;

5 an analog/digital converter that quantizes the first detection signal and the second detection signal with an over-sampling frequency four times or more an entire bandwidth of the detection signal;

10 a FFT circuit that performs Fourier transform on the first detection signal and the second detection signal quantized; and

a signal detector that detects a signal before being modulated based on an output signal of the FFT circuit, using a signal in each carrier frequency and another signal in an adjacent frequency on a USB or LSB side.

15 4. A modulation method comprising:

a USB signal forming step of performing SSB modulation on a first input symbol to obtain a USB signal;

a LSB signal forming step of performing SSB modulation on a second input symbol to obtain a LSB signal;

20 and

a step of combining the USB signal and the LSB signal,

wherein in the LSB signal forming step, SSB modulation is performed using a carrier frequency higher than a carrier frequency used in the USB signal forming step by the fundamental frequency of the input symbol.

25 5. A demodulation method comprising:

a first demodulation step of demodulating a

modulation signal by a cosine curve with a predetermined carrier frequency to obtain a first demodulation signal; and

a second demodulation step of demodulating a 5 modulation signal by a sine curve with a carrier frequency higher than the carrier frequency used in the first demodulation step by the fundamental frequency of an symbol.

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